WHAT IS CLAIMED IS:

1. A broadband fiber transmission system, comprising:

a transmission line having at least a first zero dispersion wavelength λ_{01} and a second zero dispersion wavelength λ_{02}, the transmission line operable to transmit an optical signal comprising a wavelength λ, the transmission line including a Raman gain medium that amplifies the optical signal through Raman gain; and

one or more pump sources operated at wavelengths λ_p for generating a pump light to pump the Raman amplifier, wherein λ_{01} is separated from λ_{02} by at least 50 nm.

2. The broadband fiber transmission system of Claim 1, wherein λ is within 30 nm of at least one of λ_{01} and λ_{02}.

3. The broadband fiber transmission system of Claim 1, wherein the optical signal has a wavelength λ in the range of 1430 nm and 1630 nm.

4. The broadband fiber transmission system of Claim 1, wherein the transmission line comprises at least a first optical fiber and a second optical fiber coupled to the first optical fiber.

5. The broadband fiber transmission system of Claim 1, wherein the transmission line comprises at least a first portion having a positive sign of dispersion and a second portion having a negative sign of dispersion.

6. The broadband fiber transmission system of Claim 1, wherein the Raman gain medium comprises a distributed Raman gain medium.

7. The broadband fiber transmission system of Claim 1, wherein the Raman gain medium comprises a discrete Raman gain medium.

8. The broadband fiber transmission system of Claim 1, wherein the pump light generated by the at least one pump source propagates in the Raman gain

medium in a direction that is substantially opposite the direction that the optical signal propagates the Raman gain medium.

9. The broadband fiber transmission system of Claim 1, wherein λ comprises one of a plurality of signal wavelengths forming the optical signal.

10. The broadband fiber transmission system of Claim 1, wherein at least one of the one or more pump sources comprises a semiconductor laser.

11. A method of broadband amplification, comprising:

transmitting an optical signal comprising a wavelength λ within a broadband fiber transmission system comprising a transmission line having at least a first zero dispersion wavelength λ_{01} and a second zero dispersion wavelength λ_{02}, the transmission line including a Raman gain medium that amplifies an optical signal through Raman gain; and

pumping the Raman amplifier with pump light λ_p, wherein λ_{01} is separated from λ_{02} by at least 50 nm.

12. The method of Claim 11, wherein λ is within 30 nm of at least one of λ_{01} and λ_{02}.

13. The method of Claim 11, wherein the optical signal has a wavelength λ in the range of 1430 nm and 1630 nm.

14. The method of Claim 11, wherein the Raman gain medium is a distributed Raman gain medium or a discrete Raman gain medium.

15. The method of Claim 11, wherein the transmission line comprises at least a first optical fiber and a second optical fiber coupled to the first optical fiber.

16. The method of Claim 11, wherein the transmission line comprises at least a first portion having a positive sign of dispersion and a second portion having a negative sign of dispersion.

17. The method of Claim 11, wherein the pump light propagates in the Raman gain medium in a direction that is substantially opposite the direction that the optical signal propagates the Raman gain medium.

18. The method of Claim 11, wherein λ comprises one of a plurality of signal wavelengths forming the optical signal.

19. The method of Claim 11, wherein at least one of the one or more pump sources comprises a semiconductor laser.

20. A broadband fiber transmission system, comprising:

a transmission line having at least a first zero dispersion wavelength λ_{01} and a second zero dispersion wavelength λ_{02}, the transmission line operable to transmit an optical signal comprising a wavelength λ, the transmission line including a Raman gain medium that amplifies the optical signal through Raman gain; and

one or more pump sources operated at wavelengths λ_p for generating a pump light to pump the Raman amplifier, wherein λ is within 30 nm of at least one of λ_{01} and λ_{02}.

21. The broadband fiber transmission system of Claim 20, wherein λ_{01} is separated from λ_{02} by at least 50 nm.

22. The broadband fiber transmission system of Claim 20, wherein the Raman gain medium is a distributed Raman gain medium or a discrete Raman gain medium.

23. The broadband fiber transmission system of Claim 20, wherein the pump light generated by the at least one pump source propagates in the Raman gain medium in a direction that is substantially opposite the direction that the optical signal propagates the Raman gain medium.

24. The broadband fiber transmission system of Claim 20, wherein λ comprises one of a plurality of signal wavelengths forming the optical signal.

25. The broadband fiber transmission system of Claim 24, wherein at least some of the plurality of signal wavelengths have a wavelength in the range of 1430 nm and 1630 nm.

26. A method of broadband amplification, comprising:

transmitting an optical signal comprising a wavelength λ within a broadband fiber transmission system comprising a transmission line having at least a first zero dispersion wavelength λ_{01} and a second zero dispersion wavelength λ_{02}, the transmission line including a Raman gain medium that amplifies an optical signal through Raman gain; and

pumping the Raman amplifier with pump light λ_p, wherein λ is within 30 nm of at least one of λ_{01} and λ_{02}.

27. The method of Claim 26, wherein the Raman gain medium is a distributed Raman gain medium or a discrete Raman gain medium.

28. The method of Claim 26, wherein the pump light propagates in the Raman gain medium in a direction that is substantially opposite the direction that the optical signal propagates the Raman gain medium.

29. The method of Claim 26, wherein λ comprises one of a plurality of signal wavelengths forming the optical signal.

30. The method of Claim 29, wherein at least some of the plurality of signal wavelengths have a wavelength in the range of 1430 nm and 1630 nm.